

Lab 17 - Configuring CUBE H.323-to-H.323 VoIP Connections

CCNA Voice Lab 17

Configuring CUBE H.323-to-H.323 VoIP Connections

Lab Objective:

The objective of this lab exercise is for you to learn and understand how to implement IP-to-IP gateway functionality for H.323-to-H.323 calls

Topic Description:

Unlike TDM-to-IP gateways, IP-to-IP gateways have the ability to route between, or connect, two different VoIP calls. This means that on the CUBE, a typical call has two VoIP call legs

Lab Difficulty:

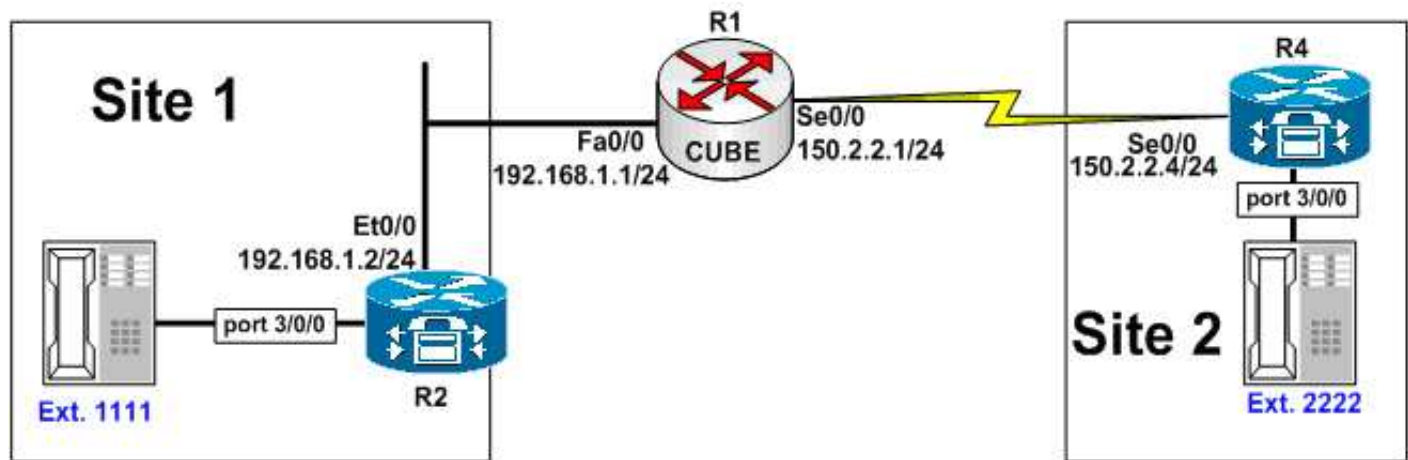
This lab has a difficulty rating of 5/10

Readiness Assessment:

When ready for your exam, you should be able to complete this lab in no more than 15 minutes

Lab Topology:

Please use the following topology to complete this lab exercise:



Lab 17 Configuration Tasks

Task 1:

Configure the hostnames and IP addresses on R1, R2 and R4 as illustrated in the diagram. Configure R4 to provide clocking to R2. Configure the clock rate on R4 as 800Kbps

Task 2:

Configure WAN connectivity between R1 and R4 using the IP addresses specified in the diagram. Configure R4 to provide a clock rate of 800Kbps to R1

Task 3:

Configure IP connectivity between R1 and R2 using the addresses illustrated in the diagram

Task 4:

Configure IP connectivity between R1, R2, and R4 using a routing protocol of your choice

Task 5:

Configure CUBE to allow H.323-to-H.323 calls between R2 and R4. Configure the appropriate dial peers based on the extensions illustrated in the diagram

Task 6:

Configure POTS and VoIP dial peers on R2 and R4 as illustrated in the diagram

Task 7:

Configure out-of-band DTMF relay for the H.323-to-H.323 calls. Configure the gateways such that the tone length is not sent. Additionally, configure the gateways so that the voice media traffic does not flow through the CUBE

Task 8:

Verify your configuration using the appropriate Cisco IOS **show** commands

Lab 17 Configuration and Verification

Task 1:

```
Router(config)#hostname R1
R1(config)#exit
```

```
Router(config)#hostname R2
R2(config)#interface Serial0/0
R2(config-if)#description .Connected To R4 Serial 0/1.
R2(config-if)#ip address 150.1.1.2 255.255.255.0
```

```
Router(config)#hostname R4
R4(config)#interface Serial0/1
R4(config-if)#description .Connected To R2 Serial 0/0
R4(config-if)#ip address 150.1.1.4 255.255.255.0
R4(config-if)#clock rate 800000
```

Verify connectivity by performing a simple ping between the two routers

```
R2#ping 150.1.1.4
```

```
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 150.1.1.4, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/4/4 ms
```

```
R4#ping 150.1.1.2
```

```
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 150.1.1.2, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/4/8 ms
```

Task 2:

```
R1(config)#int s0/0
R1(config-if)#description .Connected To R4 Serial 0/0.
R1(config-if)#ip address 150.2.2.1 255.255.255.0
R1(config-if)#no shutdown
R1(config-if)#exit
```

```
R4(config)#int s0/0
R4(config-if)#description .Connected To R1 Serial 0/0.
R4(config-if)#ip address 150.2.2.4 255.255.255.0
R4(config-if)#clock rate 800000
```

```
R4(config-if)#no shutdown  
R4(config-if)#exit
```

Verify connectivity by performing a simple ping between the two routers

R1#**ping 150.2.2.4**

```
Type escape sequence to abort.  
Sending 5, 100-byte ICMP Echos to 150.2.2.4, timeout is 2 seconds:  
!!!!  
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/4/4 ms
```

R4#**ping 150.2.2.1**

```
Type escape sequence to abort.  
Sending 5, 100-byte ICMP Echos to 150.2.2.1, timeout is 2 seconds:  
!!!!  
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/4/8 ms
```

Task 3:

```
R2(config)#int e0/0  
R2(config-if)#description .Connected To R1.  
R2(config-if)#ip address 192.168.1.2 255.255.255.0  
R2(config-if)#no shutdown
```

```
R1(config)#int f0/0  
R1(config-if)#description .Connected To R2.  
R1(config-if)#ip address 192.168.1.1 255.255.255.0  
R1(config-if)#no shutdown  
R1(config-if)#exit
```

NOTE: If you are using the Howtonetwork.net rack to complete this lab exercise, then you will also need to configure Sw1 as follows:

```
hostname Sw1  
!  
vlan 12  
 name R1_R2_VLAN  
!  
interface FastEthernet0/2  
 description 'Connected To R1 FastEthernet 0/0'  
 switchport mode access  
 switchport access vlan 12  
 no shutdown  
!  
interface FastEthernet0/3  
 description 'Connected To R2 FastEthernet 0/0'  
 switchport mode access  
 switchport access vlan 12  
 no shutdown
```

Task 4:

```
R1(config)#router eigrp 100  
R1(config-router)#no auto-summary  
R1(config-router)#network 0.0.0.0  
R1(config-router)#exit
```

```
R2(config)#router eigrp 100  
R2(config-router)#network 0.0.0.0  
R2(config-router)#no auto-summary  
R2(config-router)#exit
```

```
R4(config)#router eigrp 100  
R4(config-router)#network 0.0.0.0  
R4(config-router)#no auto-summary
```

```
...config-router)#no auto-summary,  
R4(config-router)#exit
```

Verify EIGRP adjacencies and IP connectivity between the three routers:

R1#**show ip eigrp neighbors**

IP-EIGRP neighbors for process 100

H	Address	Interface (sec)	Hold Uptime (ms)	SRTT Cnt	RTO Num	Q	Seq
1	192.168.1.2	Fa0/0	14 11:56:39	796	4776	0	12
0	150.2.2.4	Se0/0	13 11:56:39	5	200	0	15

R1#

R1#**show ip route eigrp**

150.1.0.0/24 is subnetted, 1 subnets

D 150.1.1.0 [90/2195456] via 192.168.1.2, 11:56:40, FastEthernet0/0

R2#**show ip eigrp neighbors**

IP-EIGRP neighbors for process 100

H	Address	Interface (sec)	Hold Uptime (ms)	SRTT Cnt	RTO Num	Q	Seq
1	192.168.1.1	Et0/0	10 10:54:52	5	200	0	11
0	150.1.1.4	Se0/0	13 10:56:01	6	200	0	14

R2#

R2#**show ip route eigrp**

D 192.168.2.0/24 [90/2195456] via 150.1.1.4, 10:54:53, Serial0/0

150.2.0.0/24 is subnetted, 1 subnets

D 150.2.2.0 [90/2195456] via 192.168.1.1, 10:54:53, Ethernet0/0

R4#**show ip eigrp neighbors**

IP-EIGRP neighbors for process 100

H	Address	Interface (sec)	Hold Uptime (ms)	SRTT Cnt	RTO Num	Q	Seq
2	150.2.2.1	Se0/0	12 10:51:01	23	200	0	10
0	150.1.1.2	Se0/1	14 10:52:10	19	200	0	11

R4#

R4#**show ip route eigrp**

D 192.168.1.0/24 [90/2195456] via 150.2.2.1, 10:51:36, Serial0/0
[90/2195456] via 150.1.1.2, 10:51:36, Serial0/1

Task 5:

R1(config)#**voice service voip**

R1(conf-voi-serv)#**allow-connections h323 to h323**

R1(conf-voi-serv)#**exit**

R1(config)#**dial-peer voice 1 voip**

R1(config-dial-peer)#**destination-pattern 1111**

R1(config-dial-peer)#**session target ipv4:192.168.1.2**

R1(config-dial-peer)#**exit**

R1(config)#**dial-peer voice 2 voip**

R1(config-dial-peer)#**destination-pattern 2222**

R1(config-dial-peer)#**session target ipv4:150.2.2.4**

R1(config-dial-peer)#**exit**

Task 6:

R2(config)#**dial-peer voice 1 pots**

R2(config-dial-peer)#**destination-pattern 1111**

R2(config-dial-peer)#**port 3/0/0**

R2(config-dial-peer)#**exit**

R2(config)#**dial-peer voice 2 voip**

R2(config-dial-peer)#**destination-pattern 2222**

R2(config-dial-peer)#**session target ipv4:192.168.1.1**

R2(config-dial-peer)#**exit**

R4(config)#**dial-peer voice 1 pots**

R4(config-dial-peer)#**destination-pattern 2222**

R4(config-dial-peer)#**port 3/0/0**

```
R4(config-dial-peer)#exit
R4(config)#dial-peer voice 2 voip
R4(config-dial-peer)#destination-pattern 1111
R4(config-dial-peer)#session target ipv4:150.2.2.1
R4(config-dial-peer)#exit
```

Task 7:

```
R1(config)#dial-peer voice 1
R1(config-dial-peer)#media flow-around
R1(config-dial-peer)#dtmf-relay h245-signal
R1(config-dial-peer)#media flow-around
R1(config-dial-peer)#exit
R1(config)#dial-peer voice 2
R1(config-dial-peer)#dtmf-relay h245-signal
R1(config-dial-peer)#media flow-around
R1(config-dial-peer)#exit
```

```
R2(config)#dial-peer voice 2
R2(config-dial-peer)#dtmf-relay h245-signal
R2(config-dial-peer)#exit
```

```
R4(config)#dial-peer voice 2
R4(config-dial-peer)#dtmf-relay h245-signal
R4(config-dial-peer)#exit
```

Task 8:

First, verify dial peer configuration using the **show dial-peer voice** command:

```
R1#show dial-peer voice 1 | i Voice|Type|type|media|DTMF|dtmf|flow
VoiceOverIpPeer1
```

```
peer type = voice, information type = voice,
numbering Type = 'unknown'
DTMF Relay = enabled,
type = voip, session-target = 'ipv4:192.168.1.2',
ip media DSCP = ef, ip signaling DSCP = af31,
dtmf-relay = h245-signal,
RTP dynamic payload type values: NTE = 101
Cisco: NSE=100, fax=96, fax-ack=97, dtmf=121, fax-relay=122
RTP comfort noise payload type = 19
Media Setting = flow-around (dial-peer)
Max Redirects = 1, signaling-type = cas,
```

```
R1#
```

```
R1#show dial-peer voice 2 | i Voice|Type|type|media|DTMF|dtmf|flow
VoiceOverIpPeer2
```

```
peer type = voice, information type = voice,
numbering Type = 'unknown'
DTMF Relay = enabled,
type = voip, session-target = 'ipv4:150.2.2.4',
ip media DSCP = ef, ip signaling DSCP = af31,
dtmf-relay = h245-signal,
RTP dynamic payload type values: NTE = 101
Cisco: NSE=100, fax=96, fax-ack=97, dtmf=121, fax-relay=122
RTP comfort noise payload type = 19
Media Setting = flow-around (dial-peer)
Max Redirects = 1, signaling-type = cas,
```

```
R2#show dial-peer voice 2 | i Voice|Type|type|media|DTMF|dtmf
VoiceOverIpPeer2
```

```
peer type = voice, information type = voice,
numbering Type = 'unknown'
DTMF Relay = enabled,
type = voip, session-target = 'ipv4:192.168.1.1',
ip media DSCP = ef, ip signaling DSCP = af31,
dtmf-relay = h245-signal,
```

RTP dynamic payload type values: NTE = 101
Cisco: NSE=100, fax=96, fax-ack=97, dtmf=121, fax-relay=122
RTP comfort noise payload type = 19
Max Redirects = 1, signaling-type = cas,

R4#**show dial-peer voice 2 | i Voice|Type|type|media|DTMF|dtmf**
VoiceOverIpPeer2

peer type = voice, information type = voice,
numbering Type = 'unknown'
DTMF Relay = enabled,
type = voip, session-target = 'ipv4:150.2.2.1',
ip media DSCP = ef, ip signaling DSCP = af31,
dtmf-relay = h245-signal,
RTP dynamic payload type values: NTE = 101
Cisco: NSE=100, fax=96, fax-ack=97, dtmf=121, fax-relay=122
RTP comfort noise payload type = 19
Max Redirects = 1, signaling-type = cas,

Next, place a call between the extensions in the diagram and verify your configuration:

R1#**show call active voice compact**

<callID>	A/O	FAX	T<sec>	Codec	type	Peer Address	IP R<ip>:<udp>
Total call-legs: 2							
1	ANS	T94	g729r8	VOIP	P1111	0.0.0.0:0	
2	ORG	T94	g729r8	VOIP	P2222	0.0.0.0:0	

R1#**show voip rtp connections detail**

No active connections found

R2#**show call active voice compact**

<callID>	A/O	FAX	T<sec>	Codec	type	Peer Address	IP R<ip>:<udp>
Total call-legs: 2							
2	ANS	T63	g729r8	TELE	P1111		
3	ORG	T63	g729r8	VOIP	P2222	150.1.1.4:16566	

R2#

R2#**show voip rtp connections detail**

VoIP RTP active connections :

No.	CallId	dstCallId	LocalRTP	RmtRTP	LocalIP	RemoteIP
1	3	2	17600	16566	150.1.1.2	150.1.1.4

callId 3 (dir=2): called=2222 calling=1111 redirect=
dest callId 2: called= calling=1111 redirect=
1 context 64ED6484 xmitFunc 620406E4
Found 1 active RTP connections

R4#**show call active voice compact**

<callID>	A/O	FAX	T<sec>	Codec	type	Peer Address	IP R<ip>:<udp>
Total call-legs: 2							
1	ANS	T19	g729r8	VOIP	P1111	192.168.1.2:17600	
2	ORG	T19	g729r8	TELE	P2222		

R4#

R4#**show voip rtp connections detail**

VoIP RTP active connections :

No.	CallId	dstCallId	LocalRTP	RmtRTP	LocalIP	RemoteIP
1	1	2	16566	17600	150.1.1.4	192.168.1.2

callId 1 (dir=1): called=2222 calling=1111 redirect=
dest callId 2: called=2222 calling=1111 redirect=
1 context 64F22ACC xmitFunc 620406E4
Found 1 active RTP connections

Final Relevant Configuration R1:

R1#**show running-config**

Building configuration...

Current configuration : 1917 bytes

!

```

version 12.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname R1
!
!
!
!
voice service voip
  allow-connections h323 to h323
!
!
!
!
interface FastEthernet0/0
  description .Connected To Switch 1 FastEthernet 0/2.
  ip address 192.168.1.1 255.255.255.0
  duplex auto
  speed auto
!
interface Serial0/0
  description .Connected To R4 Serial 0/0.
  ip address 150.2.2.1 255.255.255.0
!
router eigrp 100
  network 0.0.0.0
  no auto-summary
!
!
!
!
dial-peer voice 1 voip
  destination-pattern 1111
  media flow-around
  session target ipv4:192.168.1.2
  dtmf-relay h245-signal
!
dial-peer voice 2 voip
  destination-pattern 2222
  media flow-around
  session target ipv4:150.2.2.4
  dtmf-relay h245-signal

```

Final Relevant Configuration R2:

R2#**show running-config**

Building configuration...

Current configuration : 1480 bytes

```

!
version 12.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname R2
!
!
!
!
interface Ethernet0/0
  description .Connected To Switch 1 FastEthernet 0/3.
  ip address 192.168.1.2 255.255.255.0
,

```

```

!
!
!
!
router eigrp 100
 network 0.0.0.0
 no auto-summary
!
!
!
!
voice-port 3/0/0
!
voice-port 3/0/1
!
voice-port 3/1/0
!
voice-port 3/1/1
!
!
!
!
dial-peer voice 1 pots
 destination-pattern 1111
 port 3/0/0
!
dial-peer voice 2 voip
 destination-pattern 2222
 session target ipv4:192.168.1.1
 dtmf-relay h245-signal

```

Final Relevant Configuration R4:

R4#**show running-config**

Building configuration...

Current configuration : 1473 bytes

```

!
version 12.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname R4
!
!
!
!
interface Serial0/0
 description .Connected To R1 Serial 0/0.
 ip address 150.2.2.4 255.255.255.0
 clock rate 800000
 no fair-queue
!
router eigrp 100
 network 0.0.0.0
 no auto-summary
!
!
!
!
voice-port 3/0/0
!
voice-port 3/0/1
!
voice-port 3/1/0
,

```



```
!  
voice-port 3/1/1  
!  
!  
!  
!  
dial-peer voice 1 pots  
destination-pattern 2222  
port 3/0/0  
!  
dial-peer voice 2 voip  
destination-pattern 1111  
session target ipv4:150.2.2.1  
dtmf-relay h245-signal
```



© 2006-2011 HowtoNetwork.net All Rights Reserved. Reproduction without permission prohibited.